

STACKING AND MANIFOLDING OF UNITIZED SOLID OXIDE FUEL CELLS

ABSTRACT OF THE DISCLOSE

5 A fuel cell stack comprises a plurality of planar fuel cells in a spiral configuration. The fuel cells angularly offset from one another such that immediately adjacent cells only partially overlap one another. The cells are preferably of the unitized type. A manifold assembly is operatively adjacent to the fuel cells. The manifold assembly includes an inlet manifold and an outlet manifold for each of the gases that are in communication with the fuel cells.

10 The unitized solid oxide fuel cell comprises a first planar interconnect, a planar ceramic cell adjacent the first planar interconnect, a second planar interconnect adjacent the opposite side of the planar ceramic cell, and a plurality of gas tubes adjacent the planar ceramic cell. The gas tubes are arranged to a first

15 configuration, a second configuration, a third configuration and a fourth configuration with a cylindrical gas tube shape and a T-shape gas tube designs. These configurations provide a choice of co-flow, cross flow or counter flow patterns inside the cell to improve the thermal management and cell efficiency and provide more flexibilities to connect a manifold assembly. They also

20 provide an option to directly combust the spent fuel just outside the fuel cell to eliminate a separate burner for residual energy recovery. These configurations thus provide means for improved fuel cell power system efficiency and lowered capital and operational costs.